Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

   1.1. Name of the Data, data collection Project, or data-producing Program:
   2010 ARRA Lidar: Golden Gate (CA)

   1.2. Summary description of the data:
   The Golden Gate LiDAR Project is a cooperative project sponsored by the US Geological Survey (USGS) and San Francisco State University (SFSU) that has resulted in the collection and processing of high resolution 2 meter nominal pulse spacing or better LiDAR and meet objectives of the American Recovery and Reinvestment Act (ARRA). The DEM data generated from the LiDAR will be added to The National Map, a set of national geospatial datasets available to the public at no cost. During the summer of 2010, we acquired LiDAR data for the counties and parks of the Marin and San Francisco Peninsulas. SFSU's Romburh Tiburon Center for Environmental Sciences and the Hyperspectral-LiDAR Research Lab at the Univ. of Victoria has orthorectified aerial photography and hyperspectral imagery respectably.

   The project extent is based upon the watershed boundaries for all watersheds that contain the lands of Marin County and San Francisco County. It also includes the watersheds that contain Point Reyes National Seashore and the Golden Gate National Recreation Area. The area of interest includes watersheds that are also located in southern Sonoma County and northern San Mateo County and when combined total ~ 835 square miles (planimetric estimate) of area (please refer to the map below). The project area includes the Marin Peninsula and San Francisco Peninsula that form the western edge of San Francisco Bay and San Pablo Bay. These peninsulas are north and south of the strait at the mouth of San Francisco Bay called the Golden Gate. This region is the northern part of the Central California coast.

   3 data types: 1)Classified LAS v1.2, by 1500 meter x 1500 meter tile, 2)Classified LAS v1.2 tiles with buffered (1m) breaklines embedded, 3) Classified LAS v1.3 tiles with waveform.

   These data are edited and classified as: 1 (unclassified) 2 (bare-earth, ground), 4 (vegetation), 7 (noise), 9 (water) designates water in the tiles with breaklines embedded. Noise was removed for OCM storage as it was deemed unnecessary upon review.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2010-05-06 to 2010-06-05

1.5. Actual or planned geographic coverage of the data:
W: -122.99431, E: -122.97722, N: 37.992654, S: 37.979133

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:
coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Process Steps:

- 2010-07-01 00:00:00 - Sensor data collected for this project include simultaneous capture of LiDAR, multi-spectral (color), and hyperspectral imagery for the San Francisco State University LiDAR project. The project area includes 835 sq miles in Marin and San Francisco counties, Point Reyes National Seashore, the Golden Gate National Recreation Area as well as portions of San Mateo and Sonoma Counties. The data were delivered in the UTM coordinate system, meters, zone 10 north, horizontal datum NAD83, vertical datum NGVD88, via 1500 x 1500 meter tiles.   All sensors were installed together in a Cessna 207 aircraft. The LiDAR sensor used was a Leica ALS60 MPiA(multi-pulse in air) sensor collecting multiple return x, y, and z data, full wave form data as well as intensity data. The LiDAR data acquisition plan was developed to support a nominal post spacing of 2 pts/sq meter at 15 percent side-lap with 28 degree FOV to support a 1 foot contour accuracy with waveform data included. The aircraft speed was 120 kts, and flight altitude 8500 ft aMSL. The base station equipment used was a Trimble R7 with a Zephyr geodetic model 2 antenna. The control points were collected with a Trimble R8 integrated receiver and antenna unit. The calibration process considered all errors inherent with the equipment including errors in GPS, IMU, and sensor specific parameters. Adjustments were made to achieve a flight line to flight line data match (relative calibration) and subsequently adjusted to control for absolute accuracy. Compliance with the accuracy standard was ensured through the collection of GPS ground control during the acquisition of aerial LiDAR and the establishment of a GPS base station operating at the airport (Figure 2). In addition to the base station, CORS bases may have been used to supplement the solutions. The following criteria were adhered to during control point collection. 1. Each point was collected during periods of very low less than 2 PDOP. 2. No point was collected with a base line greater than 25 miles. 3. Each point was collected at a place of constant slope so as to minimize any errors introduced through LiDAR triangulation. 4. Each point was

collected at moderate intensity surfaces so any intensity based anomalies could be avoided.
- 2010-07-01 00:00:00 - The following methods were used to ensure LiDAR accuracy: 1. Rigorous LiDAR calibration: all sources of error such as the sensor's ranging and torsion parameters, atmospheric variables, GPS conditions, and IMU offsets were analyzed and removed to the highest level possible. This method addresses all errors, both vertical and horizontal in nature. Ranging, atmospheric variables, and GPS conditions affect the vertical position of the surface, whereas IMU offsets and torsion parameters affect the data horizontally. The horizontal accuracy is proven through repeatability: when the position of features remains constant no matter what direction the plane was flying and no matter where the feature is positioned within the swath, relative horizontal accuracy is achieved. 2. Absolute horizontal accuracy is achieved through the use of differential GPS with base lines shorter than 25 miles. The base station is set at a temporary monument that is 'tied-in' to the CORS network. The same position is used for every lift, ensuring that any errors in its position will affect all data equally and can therefore be removed equally. The auto-classification or 'filtering' step was performed with TerraScan to create a bare earth ground model and building classification by comparing each point's relationship with its neighbors. Algorithms consider lope, angular relationships and distance in its computations which were successful in accurately defining he ground in at least 95% of the project area.   An additional automated ground classification pass was made on the original TerraScan generated ground class (2) points to improve the quality of the points representing the ground. This was done since a significant amount of vegetation and building footprints existed in the original ground class. More than 10% of the original ground classified points were reclassified. However, this did soften the edges in terrain with very rapidly changing slope and reduced the ground point density in areas with above ground vegetation. Manual editing of the ground class (2) was done after filtering to reclassify the remaining below ground noise blunders, the remaining buildings and the most obvious remaining near ground vegetation. Ground points were manually added back in for selected coastal cliffs, large offshore rocks and large land rock outcrops in Marin County. While this manual editing was systematic and purposeful, it may have inadvertently missed some details. Manual editing to classify noise (7) in the point cloud was done to minimize the significant amount of noise points that remained in the other classes after the original vendor provided TerraScan classification. The noise points were often mostly associated with reflective surfaces in city, urban and around water. A tile by tile effort eliminated essentially all significant high and below ground noise points. Another pass eliminated the majority of the close-in noise near structures, vegetation, roads and water.
- 2016-02-10 00:00:00 - The NOAA Office for Coastal Management (OCM) received the files in laz format from USGS via an FTP online repository. The files contained lidar elevation and intensity measurements. The data were in State Plane California Zone 3 and Zone 4, NAVD88 (orthometric) heights in meters. The California Coastal

Project was divided into two projects: State Plane Zone 3 and State Plane Zone 4 respectively. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The data were converted from state plane coordinates to geographic coordinates. 2. The data were converted from NAVD88 (orthometric) heights in meters to GRS80 (ellipsoid) heights in meters using Geoid 09. 3. The LAS Noise class was dropped and Class 4 (medium vegetation scrutinized). All Class 4 points are considered to include all vegetation and man-made objects.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
No

6.1.1. If metadata are non-existent or non-compliant, please explain:
Missing/invalid information:
- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
    https://www.fisheries.noaa.gov/inport/item/49640

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
    Metadata produced and maintained in accordance with the NOAA Data Documentation
    Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-
    Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
    NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
        https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=5007
        https://coast.noaa.gov/htdata/lidar1_z/geoid18/data/5007

7.3. Data access methods or services offered:
    This data can be obtained on-line at the following URL:

    https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=5007

    The data set is dynamically generated based on user-specified parameters.;

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection
The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions
Line and Staff Offices may extend this template by inserting additional questions in this section.